

PATENT ABSTRACTS OF JAPAN

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(54) MASKING TAPE OR SHEET

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a masking tape which contains a polyolefin film as the base and which can improved contact bondability to an adhered and suitability for cutting with a cutter knife, etc.

SOLUTION: A pressure-sensitive adhesive layer is formed on one side of a base comprises as the essential ingredient a resin (a) and a polypropylene resin (b) to produce the objective masking tape or sheet. The resin (a) comprises one or more hard segments consisting of polypropylene and one or more soft segments consisting of one or more members selected among propylene/ethylene copolymers, copolymers of propylene with an α -olefin represented by the formula $\text{CH}_2=\text{CHR}$ (wherein R is a 2-8C aliphatic or aromatic group), and propylene/diene copolymers.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the masking tape or sheet which used the film of a polyolefine system for the base material in more detail about a masking tape and a sheet.

[0002]

[Description of the Prior Art] When masking conventionally to the adherend which the ***** masking tape is used for the boundary line of a color in the case of paint, such as an automobile, and the front face is curving like the bumper of an automobile, or the tank of a motorcycle especially, or is irregular, the masking tape which used the elasticity vinyl chloride which was excellent in flexibility as a base material was used. However, since chlorine gas will occur if it destroys by fire in case it discards after use, if the masking tape which used the elasticity vinyl chloride for the base material remains as it is, it cannot be incinerated, but has the problem that it is necessary to form the equipment for chlorine escapes of gas in an incinerator. On the other hand, in order to solve the above-mentioned trouble at the time of using an elasticity vinyl chloride film, the applicant of this invention has proposed the adhesive film for surface protections which used the film which consists of resin of the polyolefine system which consists of soft segments which consist of a hard segment which consists of polypropylene, ethylene propylene rubber, etc. as elasticity vinyl chloride alternate material previously as a base material. (Japanese Patent Application No. No. 22864 [seven to]) The adhesive film for surface protections which used the film which consists of this polyolefine system resin as a base material is excellent in flexibility, and the flattery nature to the adherend at the time of sticking on adherend is also excellent.

[0003]

[Problem(s) to be Solved by the Invention] However, when the film which consists of resin of the polyolefine system which consists of above hard segments and soft segments is used as an adhesive tape base material of a masking application, There is a problem of being hard to stick since it is hard to slide on a finger in a tape tooth back in case a tape is stuck by pressure with a finger at the time of masking tape attachment. Furthermore, in case a cutter knife etc. cut a masking tape, there was a problem of being hard to cut and it was not enough on the property as an adhesive tape base material of a masking application.

[0004] This invention aims at offering the masking tape or sheet which raised the sticking-by-pressure nature at the time of masking tape attachment, and the piece nature in a cutter knife etc. and which used as the base material the film which consists of polyolefine system resin in view of the above-mentioned conventional situation.

[0005]

[Means for Solving the Problem] In order to solve the above-mentioned trouble, as a result of inquiring wholeheartedly, by blending polypropylene resin with the resin of the polyolefine system which consists of a hard segment and a soft segment as an indispensable component further, and using the film which produced the film as a base material of a masking tape, this invention persons know that the masking tape or sheet with very high practicality with which the above-mentioned trouble was solved will be

obtained, and come to complete this invention.

[0006] That is, this invention is the masking tape or sheet which contains the resin which consists of an a component which comes to have a binder layer in one field of a base material, and this base material shows below, and the resin which consists of a b component as an indispensable component.

a) Resin b polypropylene resin which consists of soft segments which consist of one sort chosen from the copolymer of the hard segment which consists of polypropylene, and (1) propylene and ethylene, and the copolymer of (2) propylenes, a copolymer with the alpha olefin expressed with CHR (however, R shows the aliphatic series radical or aromatic series radical of carbon numbers 2-8) and formula $\text{CH}_2 = (3) \text{ propylene}$, and a diene compound, or two sorts or more [0007] Moreover, it is the masking tape or sheet with which 1-300 weight section combination of the polypropylene resin of b component with which this invention constitutes the above-mentioned base material was carried out to the resin 100 weight section of a component which are gay polypropylene and/or random polypropylene, and by which the polypropylene resin of b component is constituted from a hard segment and a soft segment.

[0008]

[Embodiment of the Invention] The resin which consists of an a component which constitutes a base material in this invention It is what has a hard segment and a soft segment. This hard segment polypropylene This soft segment The copolymer of (1) propylene and ethylene, a copolymer with the alpha olefin expressed in formula $\text{CH}_2 = \text{CHR}$ (however, R shows the aliphatic series radical or aromatic series radical of carbon numbers 2-8) as (2) propylene -- and The resin which consists of one sort chosen from the copolymer of (3) propylene and a diene compound or two sorts or more is used suitably.

[0009] As the above-mentioned alpha olefin, butene-1, a pentene -1, 4-methyl pentene -1, a hexene -1, octene -1, styrene, etc. are illustrated as a suitable thing.

[0010] Moreover, as a diene compound, a butadiene, 1, 4-hexadiene, 1, 5-hexadiene, ethylidene, NORUBONEN diene, etc. are illustrated as a suitable thing.

[0011] As for the hard segment and soft segment in resin, it is desirable that compatibility exists in the good condition, according to this, a film splits, a sex and stress relaxation nature become good, and the resin which consists of this a component is desirable in respect of the flattery nature to the adherend as a masking tape, or detachability. The condition that a hard segment and a soft segment join together with a block copolymer, and exist in the same molecule as a condition with the above good compatibility, the condition that make structure like IPN (mutual invasion mesh: interpenetrating polymer network), and compatibility exists in the good condition, etc. are illustrated.

[0012] the content of a soft segment -- the hard segment 100 weight section -- receiving -- the 30 - 300 weight section -- the 40 - 200 weight section is preferably suitable. While flexibility falls that the content of a soft segment is under 30 weight sections, there is an inclination for a base material to become easy to split. On the other hand, when the content of a soft segment exceeds the 300 weight sections, there is an inclination for the effect of rubber elasticity to become excessive and for the workability at the time of masking tape exfoliation to worsen.

[0013] As for the polymer which constitutes the above-mentioned hard segment or a soft segment, a gay, a block, or a random thing is illustrated.

[0014] The polypropylene resin which is b component further is blended with the resin which becomes the base material of the masking tape of this invention from the above-mentioned a component as an indispensable component. Unlike the polypropylene component contained in the resin with which the polypropylene resin of b component used in this invention consists of an a component, the resin which consists of the above-mentioned a component means the resin which consists of a polypropylene independent newly blended independently.

[0015] The polypropylene resin which is b component can be blended with the resin which consists of the above-mentioned a component in this invention as an indispensable component, and the trouble about the sticking-by-pressure nature at the time of masking tape attachment when using as a masking tape the resin which consists of an a component using the film which produced the film independently, and the piece nature at the time of a cutter knife etc. cutting a masking tape can be canceled by using the film which produced the film as a base material of a masking tape.

[0016] b) As for the loadings of the polypropylene resin which is a component, it is desirable the 1 - 300 weight section and that it is the 10 - 200 weight section preferably to the resin 100 weight section which consists of an a component. The ease of carrying out of sticking by pressure at the time of sticking a tape by pressure with a finger at the time of masking tape attachment as the loadings of polypropylene resin are under 1 weight section is spoiled, or there is an inclination for the piece nature by the cutter to worsen. On the other hand, when the loadings of polypropylene resin exceed the 300 weight sections, the flexibility of a base material falls and there is an inclination for the flattery nature of a masking tape at the time of sticking a masking tape on the adherend which has a curve side and a concave convex to fall.

[0017] Any of gay polypropylene and random polypropylene are sufficient as the polypropylene resin of the above and b component, or both may be mixed and used for it.

[0018] The base material used for the masking tape or sheet of this invention The resin which consists of the above-mentioned a component, and the resin which consists of a b component are blended as an indispensable component. The need is accepted. Minerals bulking agents, such as titanium oxide, a zinc oxide, and a calcium carbonate, Antioxidants and antioxidants, such as an amine system, a quinoline system, a hydroquinone system, a phenol system, and a phosphite system, Ultraviolet ray absorbents, such as salicylic acid derivatives, a benzophenone system, a benzotriazol system, and a hindered amine system, One sort in lubricant, a plasticizer, etc. or two sorts or more are blended in the range which is not contrary to the main point of this invention, and it is film-production-ized by the well-known film production approaches, such as extrusion molding like a tubular film process or a T-die method.

[0019] A masking tape is warmed at the temperature of dozens of degrees C - 200 degrees C after the coating of a coating in a drying tower. Therefore, even if this base material receives the heat history, what has few dimensional changes, such as contraction and expansion, is desirable. 20% or less of thing is specifically preferably used for one [at least] rate of a dimensional change of the flow direction (henceforth the direction of MD) of a base material after warming a base material at 150 degrees C for 1 hour, and the cross direction (henceforth the direction of TD), and 0 - 10% of thing is desirable especially preferably. When the rate of a dimensional change exceeds 20%, it is in the float of the terminal by contraction of a base material, and the inclination which un-arranging, such as poor sacrifice, produce.

[0020] the base material which measured the dimension of the direction of MD, and the direction of TD beforehand with the above-mentioned rate of a dimensional change -- the inside of 150-degree-C oven -- 1-hour neglect and warming -- carrying out -- warming -- the back and warming -- the difference of a dimension with a front -- warming -- it is the value which *(ed) with the front dimension.

[0021] moreover, 10% modulus (speed-of-testing 300 mm/min) in the viewpoint of curved-surface attachment nature and dimensional stability in the above-mentioned base material to 23 degree-Cx65% RH (relative humidity; relative humidity) -- usually -- 0.3-4.0 kgf/mm² -- especially -- desirable -- 0.8-2.3 kgf/mm² A thing is used desirably. 10% modulus is 0.3 kgf/mm². In the following, it is too flexible, is lacking in the dimensional stability of the tape width by the tension in the case of attachment, is in the inclination for attachment workability to worsen, and is 4.0 kgf/mm². If it exceeds, required flexibility will not be acquired, but there is an inclination it is hard coming to stick according to a bend or concave heights.

[0022] Under the conditions of 23 degree-Cx65%RH, the 10% modulus concerned is performed according to the tensile strength of JISZ-0237, and the test method of elongation, and measures the value at the time of 10% elongation.

[0023] As for this base material, the laminating of the other thermoplastics may be further carried out for amelioration of piece nature, the rewinding nature of a tape, and dimensional stability. The laminating of the layer which becomes one side or both sides of a base material of this invention which are produced from the resin with which this laminating base material consists of the above-mentioned a component, and the resin which consists of a b component from thermoplastics is carried out.

[0024] As the above-mentioned thermoplastics, polyolefine systems, such as a polyethylene, polypropylene, ethylene-vinylacetate copolymer, and ethylene-ethyl acrylate, a polyester system, a

nylon system, etc. are mentioned. Especially, the polyolefine which comes to contain polypropylene from the point of adhesion with the base material concerned more than 30 weight sections is used suitably.

[0025] In the masking tape or sheet of this invention, the mixed stock of synthetic-rubber system binders, such as an acrylic binder, a natural rubber system binder, SIS (styrene isoprene block copolymer) and SBR (styrene butadiene rubber), or IR (polyisoprene rubber), PIB (polyisobutylene), IIR (isobutylene isoprene rubber), or a natural rubber system, and a synthetic-rubber system etc. is mentioned as a binder which constitutes a binder layer, for example. Especially, a natural rubber system binder and an acrylic binder are suitably used from the point of having a high coherent property.

[0026] In addition, the thickness of the above-mentioned base material usually has 5-100-micrometer 10-50 micrometers preferably suitable for the thickness of about 60-200 micrometers and the above-mentioned binder layer. If the thickness of a binder layer is less than 5 micrometers, and target adhesion will not be acquired, but it will be in the inclination a "float" and "peeling" become easy to produce in this tape or a sheet and it will exceed 100 micrometers on the other hand, don't be in the inclination for adhesion to be too strong and for removability to worsen.

[0027] The approach currently generally used conventionally can be used as an approach of applying a binder to a base material, for example, the ** en method, the roll coater method, the reverse coating-machine method, a doctor blade method, etc. can be used.

[0028]

[Example] Although an example is given to below and this invention is more concretely explained to it, this invention is not limited to these.

[0029] (Example 1) Extrusion molding of what mixed the gay polypropylene 50 weight section was carried out to the resin (trade name: KYATAROI KS-221P, Himont make MFR(melt flow rate) 2.5g/10min) 100 weight section which has the hard segment 50 weight section which consists of polypropylene, and the soft segment 50 weight section which consists of ethylene propylene rubber, and the base material with a thickness of 100 micrometers was produced. 10% modulus of this base material -- the direction of MD -- 1.3 kgf/mm² it is -- the rate of a dimensional change of 150 degree C and 1 hour after was 3% in the direction of MD. Subsequently, corona discharge treatment was performed to both sides of this base material, the acrylic binder with a thickness of 15 micrometers was applied to one side of this processing side, the backing agent of a long-chain alkyl system has already been formed in one side, and the masking tape was produced.

[0030] (Example 2) The masking tape was produced like the example 1 except [all] KS-221P changing into the 100 weight sections and the resin with which random polypropylene consists of the 100 weight sections as resin which constitutes a base material. in addition, 10% modulus of this base material -- the direction of MD -- 1.1 kgf/mm² it is -- the rate of a dimensional change of 150 degree-C and 1 hour after was 4% in the direction of MD.

[0031] (Example 3) The masking tape was produced like the example 1 except [all] having the two-layer structure of the A horizon whose thickness it is thin from the resin presentation of the above-mentioned example 1 in the resin which constitutes a base material is 80 micrometers, and the B horizon with a thickness of 20 micrometers which consists of denaturation polyethylene (yes, milan 1605 MFR 2.8g /, and 10min) containing a carboxyl group. in addition, 10% modulus of this base material -- 1.1 kgf/mm² it is -- the rate of a dimensional change of 150 degree C and 1 hour after was 4% in the direction of MD.

[0032] (Example 1 of a comparison) As resin which constitutes a base material, the masking tape was produced like the example 1 except [all] being referred to only as KS-221P. in addition, 10% modulus of this base material -- 0.9 kgf/mm² it is -- the rate of a dimensional change of 150 degree C and 1 hour after was 5% in the direction of MD.

[0033] (Example 2 of a comparison) The masking tape was produced like the example 1 except [all] changing into the resin with which KS-221P consist of the 100 weight sections and the gay polypropylene (MFR 3.0g /, 10min, and consistency 0.9 g/cm³) 350 weight section as resin which constitutes a base material. in addition, 10% modulus of this base material -- 4.5 kgf/mm² it is -- the rate

of a dimensional change of 150 degree C and 1 hour after was 1% in the direction of MD.

[0034] (Example 3 of a comparison) As resin which constitutes a base material, the masking tape was produced like the example 1 except [all] considering only as gay polypropylene (MFR 3.0g /, 10min, and consistency 0.9 g/cm³). in addition, 10% modulus of this base material -- the direction of MD -- 4.9 kgf/mm² it is -- the rate of a dimensional change of 150 degree C and 1 hour after -- the direction of MD, and the direction of TD -- all were 1%.

[0035] 100R curved-surface attachment nature and abandonment nature were measured in adhesion, cutter piece nature, and the ease of being stuck by pressure (the ease of sliding of the finger on the tooth back of a tape) by the following measuring methods about the masking tape produced in the above-mentioned examples 1-3 and the examples 1-3 of a comparison.

[0036] [adhesion] -- the test method of JISC-2107 -- following -- the temperature of 23 degrees C, 65% of humidity RH, 2kg platen 1 of sticking-by-pressure loads round trip, and speed-of-testing 300 mm/min The exfoliation force was measured.

[0037] [Cutter piece nature] The end of a tape was stuck on adherend, the edge of the opposite side was held in the condition of having floated, and the cutter cut the center section of the tape. At this time, the case where ** and cutting were very difficult was made into x for the case where the case where a tape is able to be cut easily is hard to be cut although O and cutting were completed.

[0038] The [the sticking-by-pressure ease of carrying out] (ease of sliding of the finger on the tooth back of a tape) The tape was made to stick by pressure to adherend, letting a finger slide at a tape tooth back. At this time, it was difficult to slide smoothly, to let in O the case where a finger is easy to be stuck by pressure in a tape tooth back slide, and to let a finger slide on a tape tooth back, and the case where it was hard to make it stuck by pressure was made into x.

[0039] [100R curved-surface attachment nature] The circle of 100phi was drawn on the melamine paint plate, and the tape was stuck in accordance with the periphery. At this time, it was possible to have stuck a tape in accordance with a periphery, and attachment made the difficult thing x for that in which Siwa and a float generate the case where Siwa and a float are not generated on a tape, O and a little in accordance with ** and a periphery.

[0040] [Abandonment nature] The masking tape produced above was stuck on the melamine paint plate, with the spray gun, the urethane system coating (high urethane No.5000, Nippon Oil & Fats Co., Ltd. make) diluted with thinner was sprayed on it so that the thickness after desiccation might be set to 30 micrometers, and the tape was exfoliated after cooling even in ordinary temperature after 30-minute desiccation at 70 degrees C. The plainness of a parting line and the linearity of a parting line were investigated visually. At this time, the enter lump of the coating to O and the tape application attachment section was seen a little in that from which the clear parting line was obtained, the enter lump of ** and a coating was intense in what has the not not much clear parting line, and the parting line made the not clear thing x.

[0041] An evaluation result is shown in Table 1.

[0042]

[Table 1]

	粘着力 (g/15mm)	カッター 切れ性	圧着し易さ	100R曲面 貼付け性	見切り性
実施例 1	220	○	○	○	○
実施例 2	210	○	○	○	○
実施例 3	200	○	○	○	○
比較例 1	200	△	×	○	○
比較例 2	240	○	○	×	○
比較例 3	240	○	○	×	○

[0043] It turns out that the masking tape of the examples 1-3 which have the configuration specified in this invention has satisfied each practical use property demanded as a masking tape so that clearly also from Table 1. The masking tape of the example 1 of a comparison which used the film which consists only of resin which, on the other hand, consists of a hard segment containing polypropylene and a soft segment has a problem in the piece nature by the ease of being stuck by pressure and cutter at the time of tape application attachment, and cannot attain the purpose of this invention.

[0044]

[Effect of the Invention] The masking tape or sheet of this invention can improve now the sticking-by-pressure nature at the time of the masking tape attachment which could not be accomplished, and the piece nature in a cutter knife by having a configuration like the above with the masking tape which used as the base material the film which consists of conventional polyolefine system resin. Therefore, if the masking tape of this invention is used, the effectiveness of the attachment activity (especially trade-on-its-own-account activity) to adherend can be raised. Moreover, since the vinyl chloride is not used for a base material, even if it incinerates the masking tape after use, gas with harmful chlorine gas etc. is not generated.

[Translation done.]